

# Upper Pliocene Fan 1 (UP F1) Play

## *Buliminella* 1 biozone

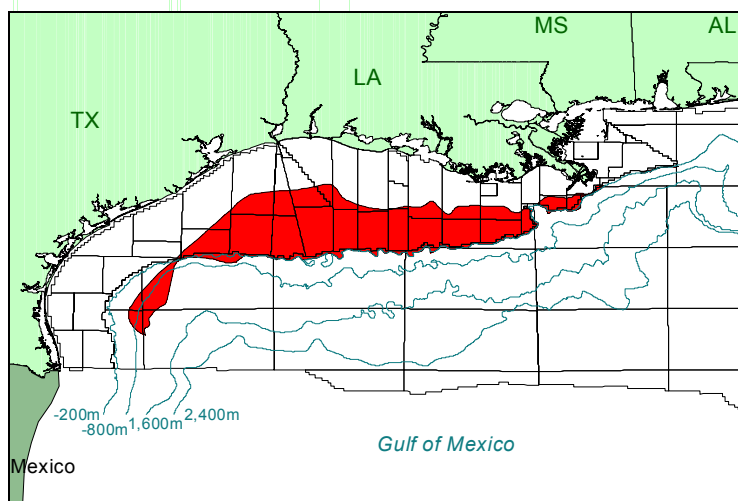


Figure 1. Play location.

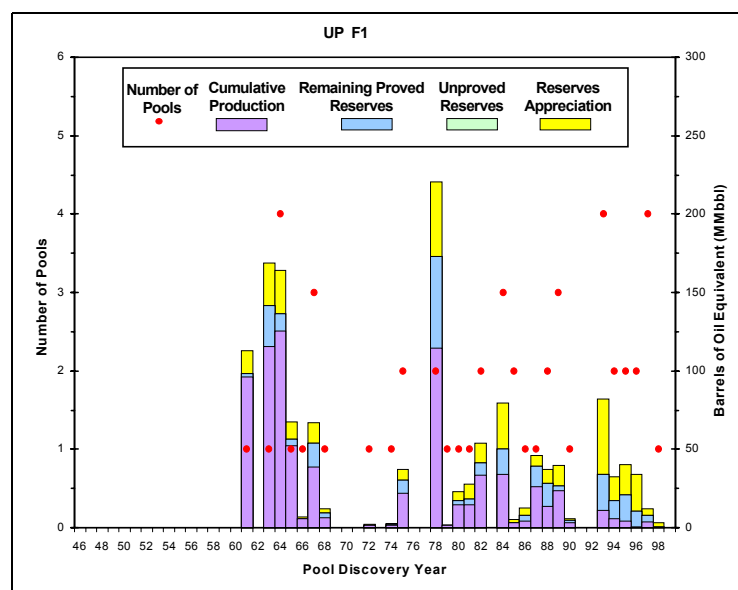


Figure 2. Exploration history graph showing reserves addition and number of pool discoveries by year.

UP F1 Play				
51 Pools 206 Sands	Minimum	Mean	Maximum	
Water depth (feet)	71	219	635	
Subsea depth (feet)	6400	11994	16136	
Number of sands per pool	1	4	23	
Porosity	22%	28%	33%	
Water saturation	16%	28%	55%	

Table 1. Pool attributes. Values are volume-weighted averages of individual reservoir attributes.

## Play Description

The established Upper Pliocene Fan 1 (UP F1) play occurs within the *Buliminella* 1 biozone and is defined by deep-sea fan sediments in an extensional structural regime of salt-withdrawal basins and extensive listric faulting located on the modern GOM shelf. The play extends from the Corpus Christi and Port Isabel Areas offshore Texas to the South Pass and northern Mississippi Canyon Areas near the present-day Mississippi River Delta (figure 1).

Updip and to the northeast, the play is bounded by the shelf/slope break associated with the *Buliminella* 1 biozone and grades into the deposits of the Upper Pliocene Progradational (UP P1) play. To the southwest, the play is limited by a marked decrease in sediment influx at the edge of the UP depocenter. The southern extension of the play is limited by the structural boundary of the Upper Pliocene Fan 2 (UP F2) play.

Miocene delta systems of Texas no longer provided significant clastic influx to the present-day Texas offshore area, and the ancestral Mississippi River Delta System became the dominant depocenter during UP time.

## Play Characteristics

The UP F1 play is characterized by deep-sea fan systems deposited basinward of the UP shelf margin. Component depositional facies include channel/levee complexes, sheet-sand lobes, interlobes, lobe fringes, and slumps that were deposited on the UP upper and lower slope in topographically low areas between salt structure highs and on the abyssal plain. These deep-sea fan systems are often overlain by thick shale intervals representative of zones of sand bypass on the shelf, or sand-poor zones on the slope.

Nearly one-half of the fields

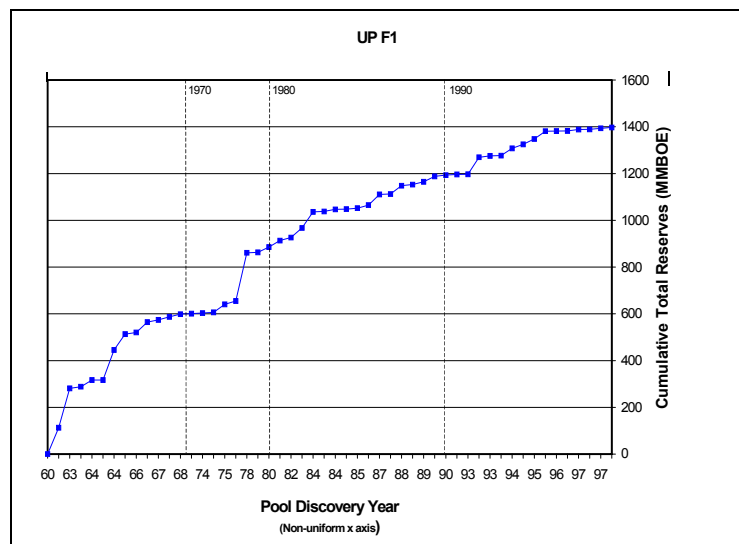


Figure 3. Plot of pools showing cumulative reserves by discovery order. Note the non-uniform x axis.

UP F1 Play Marginal Probability = 1.00	Number of Pools	Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)
<b>Reserves</b>				
Original proved	51	0.336	3.946	1.038
Cumulative production	--	0.257	2.928	0.778
Remaining proved	--	0.079	1.017	0.260
Unproved	0	0.000	0.000	0.000
Appreciation (P & U)	--	0.131	1.281	0.359
<b>Undiscovered Conventionally Recoverable Resources</b>				
95th percentile	--	0.253	3.775	1.023
Mean	66	0.335	4.850	1.198
5th percentile	--	0.428	5.584	1.381
<b>Total Endowment</b>				
95th percentile	--	0.720	9.002	2.420
Mean	117	0.802	10.077	2.595
5th percentile	--	0.895	10.811	2.778

Table 2. Assessment results for reserves, undiscovered conventionally recoverable resources, and total endowment.

in the UP F1 play are structurally associated with salt diapirs with hydrocarbons trapped on diapir flanks or in sediments draped over diapir tops. Other trapping structures are normal faults and growth fault anticlines. In addition, a few fields contain hydrocarbon accumulations trapped by permeability barriers, updip pinchouts, or facies changes. Seals are provided by the juxtaposition of reservoir sands with shales and salt, either structurally (e.g., faulting, diapirism) or stratigraphically (e.g., lateral shale-outs, overlying shales).

## Discoveries

The UP F1 mixed gas and oil play contains total reserves of 0.467 Bbo and 5.227 Tcfg (1.397 BBOE), of which 0.257 Bbo and 2.928 Tcfg (0.778 BBOE) have been produced. The play contains 206 producible sands in 51 pools, and all 51 pools contain proved reserves (table 1; refer to the Methodology section for a discussion of reservoirs, sands, and pools). The first reserves in the play were discovered in the Ship Shoal 208 field in 1961 (figure 2). Maximum yearly total reserves of 221 MMBOE were added in 1978 when two pools were discovered, including the largest pool in the play in the South Pass 89 field with 206 MMBOE in total reserves (figures 2 and 3). The most recent discovery, prior to this study's cutoff date of January 1, 1999, was in 1998.

The 51 discovered pools contain 404 reservoirs, of which 196 are nonassociated gas, 164 are undersaturated oil, and 44 are saturated oil. Cumulative production has consisted of 67 percent gas and 33 percent oil.

## Assessment Results

The marginal probability of hydrocarbons for the UP F1 play is 1.00. The play contains a mean total endowment of 0.802 Bbo and 10.077 Tcfg (2.595 BBOE) (table 2). Thirty percent of this BOE mean total

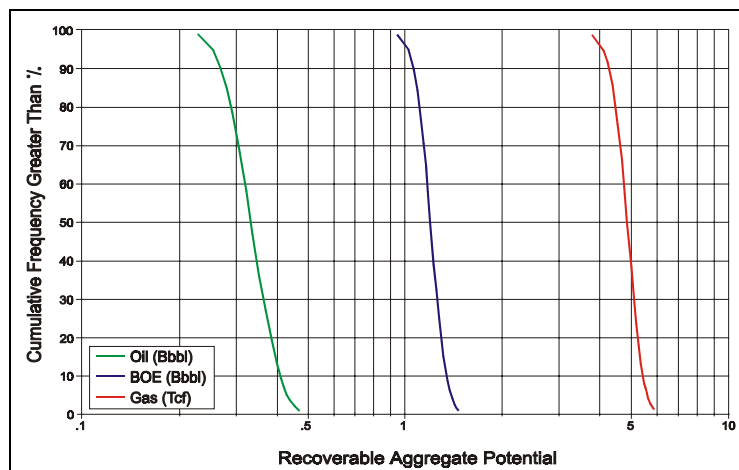


Figure 4. Cumulative probability distribution for undiscovered conventionally recoverable resources.

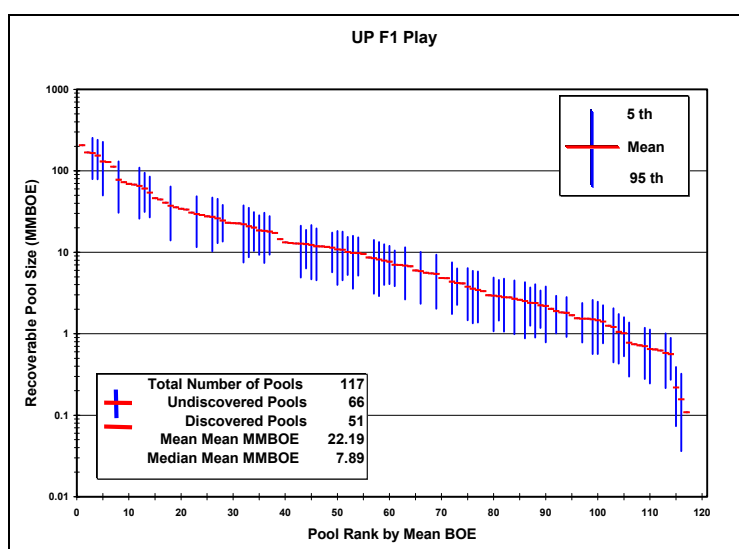


Figure 5. Pool rank plot showing the number of discovered pools (red lines) and the number of pools forecast as remaining to be discovered (blue bars).

endowment has been produced.

Assessment results indicate that undiscovered conventionally recoverable resources (UCRR) have a range of 0.253 to 0.428 Bbo and 3.775 to 5.584 Tcfg at the 95th and 5th percentiles, respectively (figure 4). Mean UCRR are estimated at 0.335 Bbo and 4.850 Tcfg (1.198 BBOE). These undiscovered resources might occur in as many as 66 pools. The largest undiscovered pool, with a mean size of 165 MMBOE, is forecast as the third largest pool in the play (figure 5). The forecast places the next four undiscovered pools in positions 4, 5, 8, and 12 on the pool rank plot. For all the undiscovered pools in the UP F1 play, the mean mean size is 18 MMBOE, which is substantially smaller than the 27 MMBOE mean size of the discovered pools. The mean mean size for all pools, including both discovered and undiscovered, is 22 MMBOE.

The UP F1 play is the largest of 14 Gulf of Mexico fan 1 plays on the basis of BOE mean UCRR. BOE mean UCRR also contribute over 1 BBOE, or 46 percent, of the UP F1 play's BOE mean total endowment. Exploration potential continues to exist around salt in deep structural and stratigraphic traps as well as in structures located underneath salt overhangs and salt sheets. Three fields containing over 100 MMBOE are forecast as remaining to be discovered.